



**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2020-1025; Project Identifier MCAI-2020-00757-E; Amendment 39-21630; AD 2021-14-03]**

**RIN 2120-AA64**

**Airworthiness Directives; Rolls-Royce Deutschland Ltd & Co KG (Type Certificate previously held by BMW Rolls-Royce GmbH and BMW Rolls-Royce Aero Engines) Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** The FAA is adopting a new airworthiness directive (AD) for certain Rolls-Royce Deutschland Ltd. & Co KG (RRD) BR700-715A1-30, BR700-715B1-30, and BR700-715C1-30 model turbofan engines. This AD was prompted by reports of HPT stage 1 blades failing in service due to sulphidation and subsequent crack initiation. This AD requires removal and replacement of the HPT stage 1 blade and HPT stage 1 blade damper. The FAA is issuing this AD to address the unsafe condition on these products.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** For service information identified in this final rule, contact Rolls-Royce Deutschland Ltd. & Co KG, Eschenweg 11, 15827 Blankenfelde-Mahlow, Germany; phone: +49 (0) 33 708 6 0; email: [rrd.techhelp@rolls-royce](mailto:rrd.techhelp@rolls-royce); website: <https://www.rolls-royce.com/contact-us.aspx>. You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA,

call (781) 238-7759. It is also available at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-1025.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-1025; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, any comments received, and other information. The address for Docket Operations is U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Barbara Caufield, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7146; fax: (781) 238-7199; email: [barbara.caufield@faa.gov](mailto:barbara.caufield@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Background**

The FAA issued a notice of proposed rulemaking (NPRM) to amend 14 CFR part 39 by adding an AD that would apply to certain RRD BR700-715A1-30, BR700-715B1-30, and BR700-715C1-30 model turboprop engines. The NPRM published in the *Federal Register* on November 13, 2020 (85 FR 72608). The NPRM was prompted by reports of HPT stage 1 blades failing in service due to sulphidation and subsequent crack initiation, due to contamination of the blade shank passing by the blade damper. In the NPRM, the FAA proposed to require removal and replacement of the HPT stage 1 blade and HPT stage 1 blade damper. The FAA is issuing this AD to address the unsafe condition on these products.

The European Aviation Safety Agency (EASA), which is the Technical Agent for the Member States of the European Community, has issued EASA AD 2018-0194, dated September 4, 2018 (referred to after this as “the MCAI”), to address the unsafe condition on these products. The MCAI states:

Occurrences have been reported on RRD BR700-715 engines  
where certain HP turbine stage 1 blades failed in service.

Investigation of these events showed that these were caused by sulphidation and subsequent crack initiation, due to contamination of the blade shank passing by the blade damper.

This condition, if not corrected, could lead to further HP turbine stage 1 blade failures, possibly resulting in engine in-flight shut-down and consequent reduced control of the aeroplane.

To address this potential unsafe condition, RRD published the NMSB to provide instructions to replace the affected assembly.

For the reasons described above, this [EASA] AD requires determination of the engine configuration and, depending on findings, removal of the engine from service to replace the affected assembly.

You may obtain further information by examining the MCAI in the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2020-1025.

## **Discussion of Final Airworthiness Directive**

### **Comments**

The FAA received comments from one commenter. The commenter was Delta Airlines (Delta). The following presents the comments received on the NPRM and the FAA's response to each comment.

### **Request to Revise Definition of “Parts Eligible for Installation”**

Delta requested that the FAA revise the definition of “parts eligible for installation” to avoid the necessity of an alternate method of compliance (AMOC) request each time Rolls-Royce introduces a new part number for the HPT stage 1 blade or HPT stage 1 damper.

The FAA agrees and revised the definition of “parts eligible for installation” to allow installation of HPT stage 1 blades and HPT stage 1 dampers approved as eligible for installation in accordance with certain RRD service information.

### **Request to Clarify Compliance Time Language**

Delta requested that the FAA revise paragraph (g)(1)(i) in the Required Actions section of this AD to refer to “flight cycles since new” instead of “flight cycles since first

installation,” as proposed in the NPRM. Delta noted that the proposed language could be misinterpreted as referring to any affected HPT stage 1 blade, regardless of whether the affected HPT stage 1 blade is currently installed on an engine.

The FAA partially agrees. The FAA agrees to update this reference to avoid possible misinterpretation, but disagrees with the specific language proposed by the commenter. The FAA has updated paragraph (g)(1)(i) of this AD to read: “Before an affected HPT stage 1 blade exceeds 10,000 flight cycles (FCs) since first installation...”

### **Conclusion**

The FAA reviewed the relevant data, considered any comments received, and determined that air safety requires adopting this AD as proposed. Accordingly, the FAA is issuing this AD to address the unsafe condition on these products. Except for minor editorial changes and any other changes described previously, this AD is adopted as proposed in the NPRM. None of the changes will increase the economic burden on any operator.

### **Related Service Information under 1 CFR Part 51**

The FAA reviewed RRD BR700 Series Alert Non-Modification Service Bulletin (NMSB) SB-BR700-72-A900640, Revision 1, dated August 31, 2018. The Alert NMSB describes procedures for removing and replacing the HPT stage 1 blade and HPT stage 1 blade damper. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

### **Other Related Service Information**

The FAA reviewed RRD Service Bulletin (SB) SB-BR700-72-102005, dated March 20, 2018; RRD NMSB SB-BR700-72-900118, dated June 6, 2017; and RRD SB SB-BR700-72-101671, dated January 29, 2010. RRD SB SB-BR700-72-102005, dated March 20, 2018, introduces a new HPT stage 1 blade damper with a front restrictor that reduces the average airflow into the blade shank cavity, thereby reducing deposition of particles in the cavity. RRD NMSB SB-BR700-72-900118, dated June 6, 2017, describes procedures for recording the serial numbers of the cleaned, crack tested, and examined

HPT stage 1 blades. RRD SB SB-BR700-72-101671, dated January 29, 2010, introduces a redesigned HPT stage 1 blade that improves robustness and stress characteristics.

### **Costs of Compliance**

The FAA estimates that this AD affects 222 engines installed on airplanes of U.S. registry. The agency estimates that the service life of both the HPT stage 1 blade and HPT stage 1 blade damper are 5.5 years. Based on this life estimate, the agency is providing an estimated annual cost to replace these parts.

The FAA estimates the following costs to comply with this AD:

#### **Estimated costs**

| <b>Action</b>  | <b>Labor Cost</b>                             | <b>Parts Cost</b> | <b>Cost per product</b> | <b>Annualized Cost on U.S. operators</b> |
|--|---|-------------------|-------------------------|--|
| Replace HPT stage 1 blade and HPT stage 1 blade damper | 20 work-hours<br>x \$85 per hour<br>= \$1,700 | \$692,000         | \$693,700               | \$28,000,524                             |

The FAA has included all known costs in its cost estimate. According to the manufacturer, however, all of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

## **Regulatory Findings**

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Will not affect intrastate aviation in Alaska, and
- (3) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **The Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

**2021-14-03 Rolls-Royce Deutschland Ltd & Co KG (Type Certificate previously held by BMW Rolls-Royce GmbH and BMW Rolls-Royce Aero Engines):**

Amendment 39-21630; Docket No. FAA-2020-1025; Project Identifier MCAI-2020-00757-E.

#### **(a) Effective Date**

This airworthiness directive (AD) is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

**(c) Applicability**

This AD applies to all Rolls-Royce Deutschland Ltd. & Co KG (Type Certificate previously held by BMW Rolls-Royce GmbH and BMW Rolls-Royce Aero Engines) (RRD) BR700-715A1-30, BR700-715B1-30, and BR700-715C1-30 model turbofan engines with high-pressure turbine (HPT) stage 1 blade, part number (P/N) BRH17133, BRH19984, BRH20011, BRH20237, BRH20351, FW35594, FW45914, FW64379, or FW75735, and with HPT stage 1 blade damper, P/N BRH10943, BRH20353, or FW45770, installed.

**(d) Subject**

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

**(e) Unsafe Condition**

This AD was prompted by reports of HPT stage 1 blades failing in service due to sulphidation and subsequent crack initiation. The FAA is issuing this AD to prevent failure of the HPT stage 1 blade. The unsafe condition, if not addressed, could result in the release of the HPT stage 1 blade, failure of the engine, in-flight shutdown, and loss of the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

(1) For affected engines that have not operated exclusively under the Hawaiian Flight Mission:

(i) Before an affected HPT stage 1 blade exceeds 10,000 flight cycles (FCs) since first installation of that affected HPT stage 1 blade, or within 50 FCs after the effective date of this AD, whichever occurs later, remove the affected HPT stage 1 blade and the affected HPT stage 1 blade damper from service and replace with parts eligible for installation using the Accomplishment Instructions, paragraph 3.R. through T., of RRD Alert Non-Modification Service Bulletin (NMSB) SB-BR700-72-A900640, Revision 1, dated August 31, 2018 (NMSB SB-BR700-72-A900640).

(ii) If an HPT stage 1 blade has been cleaned and examined before the effective date of this AD using RRD NMSB SB-BR700-72-900118, dated June 6, 2017, within

1,500 FCs from the last cleaning and examination, or within 10 FCs after the effective date of this AD, whichever occurs later, remove the affected HPT stage 1 blade and affected HPT stage 1 blade damper from service and replace with parts eligible for installation using Accomplishment Instructions, paragraph 3.R. through T., of RRD NMSB SB-BR700-72-A900640.

(2) For affected engines operated exclusively under the Hawaiian Flight Mission:

(i) At the next change of the flight mission after the effective date of this AD, replace the affected HPT stage 1 blade and affected HPT stage 1 blade damper in accordance with paragraphs (g)(1)(i) and (ii) of this AD.

(ii) [Reserved]

**(h) Installation Prohibition**

After the effective date of this AD, do not install any HPT stage 1 blade, P/N BRH17133, BRH19984, BRH20011, BRH20237, BRH20351, FW35594, FW45914, FW64379, or FW75735, with any HPT stage 1 blade damper, P/N BRH10943, BRH20353, or FW45770, in any engine.

**(i) Definitions**

(1) For the purpose of this AD, “parts eligible for installation” are an HPT stage 1 blade, P/N FW75735, or a P/N approved for installation in accordance with paragraph 2.C of RRD NMSB SB-BR700-72-A900640, installed with HPT stage 1 blade damper, P/N KH82098, or a P/N approved for installation in accordance with paragraph 2.C of RRD NMSB SB-BR700-72-A900640.

(2) For the purpose of this AD, the “Hawaiian Flight Mission” are flights operated by Hawaiian Airlines.

**(j) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in Related Information. You may email your request to: ANE-AD-AMOC@faa.gov.



(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(k) Related Information**

(1) Barbara Caufield, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7146; fax: (781) 238-7199; email: barbara.caufield@faa.gov.

(2) Refer to European Aviation Safety Agency (EASA) AD 2018-0194, dated September 4, 2018, for more information. You may examine the EASA AD in the AD docket at <https://www.regulations.gov> by searching for and locating it in Docket No. FAA-2020-1025.

**(l) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Rolls-Royce Deutschland Ltd. & Co KG (RRD) BR700 Series Alert Non-Modification Service Bulletin SB-BR700-72-A900640, Revision 1, dated August 31, 2018.

(ii) [Reserved]

(3) For RRD service information identified in this AD, contact Rolls-Royce Deutschland Ltd. & Co KG, Eschenweg 11, 15827 Blankenfelde-Mahlow, Germany; phone: +49 (0) 33 708 6 0; email: rrd.techhelp@rolls-royce; website: <https://www.rolls-royce.com/contact-us.aspx>.

(4) You may view this service information at FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (781) 238-7759.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the

availability of this material at NARA, email: [fedreg.legal@nara.gov](mailto:fedreg.legal@nara.gov), or go to:  
<https://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued on June 21, 2021.

Gaetano A. Sciortino, Deputy Director for Strategic Initiatives,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

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